

## APPENDIX J

### Water Use Factors Water Use Analysis Tool (WUAT) PA DEP April 16, 2007

The water use factors contain in this document is a first round and should be treated as untested estimates. The purpose is to produce a dataset of withdrawals as input into the USGS water availability screening tool for a statewide test run of current data. These factors are necessary in order to further produce results from WUAT. Water factors are used to calculate a quantity (gpd) for individual points of withdrawals located during the development of WUAT.

#### *Task 1. Agriculture - Irrigation*

The water use factors in Table 1 are for irrigated agriculture, gallons per day per acre, for the top ten ranking counties based on 31 day average for August (peak month), computed for drought 10 year return period projected for the year 2010. These factors are based on analysis provided to DEP from Dr. Al Jarrett, PSU.

		<b>T = 10 years</b>
<b>County</b>	<b>Rank</b>	<b>gal/day/acre</b>
LANCASTER	1	3,953
FRANKLIN	2	3,184
ADAMS	3	3,456
ERIE	4	3,966
BERKS	5	4,364
SCHUYLKILL	6	4,486
LEBANON	7	3,713
CHESTER	8	4,093
LYCOMING	9	3,435
YORK	10	3,935

Table 1. Water Use factors per county for irrigated agriculture.

#### *Task 2. Agriculture - Livestock*

Water use for livestock for the top ten ranking counties was completed in the WUAT using Dr. Jarrett's analysis.

*Task 3. Public Water Supply - Residential*

A summary table was generated summing the total water use for domestic use for all source(s) for each PWS. The summary table produced 1,457 unique records and was joined to the layer containing the population of each PWS. Water use factors were calculated for 27 PWS from a total of 1,937. The selected PWS represent the largest based on population. Table 2 shows a summary of the water use results per person and PWS.

	<b>N</b>	<b>Average</b>	<b>Median</b>	<b>Minimum</b>	<b>Maximum</b>	<b>St. dev.</b>
Per Person Water Use (gpd)	27	<b>75</b>	67	28	156	26
Total PWS Water Use (gpd)	27	16,196,828	7,683,857	2,637,055	154,497,308	29,878,408
Total Population within PWS	27	212,560	103,380	5,0825	1,517,815	327,448

Table 2. PWS Residential water factors based on WUAT

*Task 4. Public Water Supply - Non-Residential*

A summary table was generated from the “Reg\_PWS” layer summing the water use for nondomestic use of all source(s) for each PWS. The summary table produced 1,457 unique records and was joined to the layer, “PWS\_Nonres” containing the numbers of employees per PWS service area.

	<b>N</b>	<b>Average</b>	<b>Median</b>	<b>Miniumum</b>	<b>Maximum</b>	<b>St. dev.</b>
Per Employee Water Use (gpd)	694	600	118	0	59,380	3,409
Total PWS (gpd)	694	8,884,767	64,410	1	113,888,240	5,358,621

Table 3. PWS Non-Residential water factors based on WUAT

*Tasks 5, 6, 7, & 8. Self-Supplied Residential, Non-Residential*

Since the water use factor derived in WUAT produced unrealistic results for many of the PWS, the water use factors, shown in Table 4, should be used until further analysis is done on the WUAT.

Per person average daily water use factor (gpd)	80
Per Employee (Manufacturing) average daily water use factor	665
Per Employee (Non- Manufacturing) average daily water use factor (gpd)	42

Table 4. Water Use Factors from CDM Pilot Study Report, September 2005

*Tasks 9, 10, 11, 12. Mining, Hydroelectric, Thermolectric, and Golf courses*

Calculate a quantity for each registered source by dividing the annual withdraw by days use.